American Electro-platers' Society

(An Educational Society)

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MONTHLY REVIEW

AUGUST, 1914

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Editorial Staff

H. E. WILLMORE, *Editor-in-Chief.*
5911 South Boulevard, Chicago, Illinois.

Associate Editors

COL. J. H. HANSJOSTEN, President Supreme Society

GEORGE B. HOGABOOM, Past President Supreme Society

C. H. PROCTOR, Honorary Member Supreme Society.

OSCAR E. SERVIS, President Chicago Branch.

HARRY DE JOANNIS, Bridgeport Branch

FRED J. LISCOMB, Chicago Branch

ERNEST LAMOUREUX, Chicago Branch

I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—*Amiel.*

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MONTHLY REVIEW

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Vol. 1 AUGUST, 1914 No. 3

Editorial

Who's To Blame?

It seems to the Editor that with the number of members we have in the American Electro-plater's Society, it should not be necessary to make an appeal for papers for the REVIEW. If we are to have an issue every month, we must have material and it is up to the members of the different branches to supply it. It is well known that we have a number of capable men in the Society, men who from study and experience have learned a lot of things about plating and its numerous branches that would make interesting reading. What we want is direct information that will be of benefit to the plater, processes, results of experiments, methods best adapted to handling work and producing results, not preaching and sermonizing; and our space is too valuable to be taken up with eulogies of individuals.

All the branches are holding meetings once or twice a month; but we do not see from the Secretaries' meager reports, except in one or two instances, that their members are preparing and presenting papers.

Every branch and every member must do a share of the work to make a success of the MONTHLY REVIEW. If you do not do your part, you are placing an additional burden on the shoulders of others, and this, in our judgment, is absolutely unfair; that is. on the merits that one good turn deserves another.

What is the object of the formation of your branch, if not to impart information to your fellow member; he has joined the Society upon false representation if he cannot gain or present information to those seeking knowledge along electro-plating lines. Each member expects to reap a certain benefit or he would not be a member, and all branches should share equally their contributions to the pages of our journal; but this appears to be a theory and not a custom among some of the branches.

There certainly is much cause for complaint. The members feel this. Some of them consciously, some unconsciously; but all of them feel it, and there can be no lasting benefit so long as these conditions obtain.

While we do not believe there is a more sociable group of men than the members of the A. E. S., it must be borne in mind that the Society was not formed for social purposes only. The American Electro-platers' Society was formed for the purpose of

disseminating knowledge of the plating profession among its members and it is of great practical value to keep in touch with what is going on in the Society.

Send us your plating problems and we will present them to the members for solution.

It is especially urgent on the Secretaries of the various branches to each month send in a report of what their respective branches are doing. Every one is interested in what the other fellow does; but don't let the other fellow do all the work.

"The Power of Knowledge"*

By J. E. Younger

We can still hear a faint echo of that historic gavel calling to order the Second Annual Convention of the A. E. S. convention of great importance concerning a splendid cause, one of mighty interest to all Electro Platers, and the passing into history, but not into oblivion, a meeting of enthusiasm, friendship and splendor. By men who, by their untiring efforts, have risen to the highest pinnacle in the chosen calling; by men who, by virtue of their good will and nature, came from far and near in response to a duty call to our great city, a call to further extend the great work that has been done, so well performed, to enlighten the heart of every member of our craft and society, to enkindle the spark that has just been started, and to encourage that everlasting spirit of good fellowship in all.

In this event just passed gives me an inspiration that has been greatly referred to in the past (good fellowship) and higher knowledge.

In this industrial age, the age of triumphant knowledge, the age of marvelous advances and industrial progress, were we to peruse the records of any of the various crafts, scrutinize the achievements of many of the professions and sciences, more conspicuous would become the fact that, within the past few years no greater advances, no greater material or industrial progress has been made, than in the electro deposition and coloring of metals.

Chemistry and Electro Plating, in other words, science and manual skill, very recently have become united to such an extent that it is at this time impossible for one to make any prognostications as to how far, and to what extent the science of chemistry and the art of electro plating will lead to.

From a scientific point of view, many of the daily performances of an Electro Plater appear to be quite trivial, yet results are attained that are actually surprising and many peculiar obstacles must be overcome and considerable manipulating of scientific principles before any degree of success can be attained. It has probably never occurred to some Platers that when compounding chemicals or ingredients to form any of his various solutions necessary to acquire definite results, that he has elevated himself beyond what we

*Read before Chicago Branch, June 27, 1914.

may designate as an art, or a trade, to one of science. Can we define it otherwise when it is based upon scientific principles and theory? But can we rely entirely upon scientific principles and theories? In Electro Plating we have all apparently practiced extravagance at some time or other, simply because of experimenting with exaggerated ideas or theories. I believe it is a just statement to make when I say that even up to the present time it is necessary for us all to employ various methods to obtain desired results and effects, casting theories to the winds, and naturally deciding upon the most seemingly practical method. But at times we become acquainted with the fact that even then we cannot accomplish that which we desire, but to produce the goods we must unite theory and practical experience. This is not a mere simple fact, but a peculiar characteristic, and a natural and logical sequence in an Art of apparently inexhaustible limits, and we certainly have to go the limits at some time or other.

May I venture to assert that if there should be any Plater that can, during his daily ventures and performances, with but little effort, surmount the obstacles that present themselves at all times, certainly indicates that he has conquered, and has reached the highest goal. I am sure his fellow craftsmen will unanimously agree to extend to him the heartiest congratulations and be justly proud of him.

Sincerely hoping that we can all conquer and reach that higher goal, the goal of higher knowledge which will put us all on an equal plane, with that A. E. S. spirit of appreciation—co-operation, and finally a genuine pride in helping one another in reaching that goal, and until we have studied more thoroughly and impressed upon ourselves the value of that higher knowledge, we will do well to abide by many of the valuable practical theories given to us by our fellow members and by some of our most eminent chemists that have gone before, but there can be no question that in time and years to come, the obstacles that now obstruct our paths will be surmounted with comparative ease.

Almost all or many of the scientific and mechanical methods and devices used today are based upon theory, some may seem comparatively simple, and again some theories advanced seem so perplexing that we can scarcely comprehend them, and, on the other hand, theories that may seem difficult and complicated may be remarkably easy to comprehend when the correct method of procedure is applied, either from a chemical or mechanical point of view.

There are, however, certain unique and peculiar difficult theories encountered. This practical experience has demonstrated to all of us, I believe. Some are so abnormal and erratic that we are obliged to abandon entirely at the present time. It is evident, therefore, that to those individuals that are qualified to transform some of these erratic theories into permanent practical experiments, are the individuals that should receive fully all the appreciation that can be shown them. They in return should give to us that have not had

the opportunities to progress along more scientific lines, or fortunate enough to possess the required knowledge enabling us to pursue more scientific principles.

When we get right down to the adequate analysis of the whole situation, we will discover that knowledge is not only power, but a true safe-guard against the perils of ignorance. To those who possess that greater knoledge, it must give them great pleasure to look back and refresh their memories of that glorious struggle in acquiring such knowledge, and the fulfillment of a life-long ambition. Once a Plater, always a Plater.

Electro Plating in its infancy was to a great extent shrouded in obscurity; a great conspiracy of secrecy seemed to exist among the Platers. It is quite incomprehensible to me, at this time, that in looking back to those days of modern progress, how they could so long have conspired to pass over in silence, an art, a trade, or a science. It is certainly gratifying to know htat we have awakened from our slumbers and our ignorance and are no longer groping about in darkness, but journeying through an era that radiates light from all directions.

What can we submit in justice to our later and more sensible method of extending to one another by men, especially those, who by virtue of their peculiar qualities and learning, have contributed of their thought and skill in perfecting formulaes and processes. It is certain that no human influence could deny them the appreciation and glory that they so well deserve, in devoting of their time and energy to a science that has been so wonderfully developed in such an apparently short space of time. Let those who have grown wiser through their generosity in offering to us, what they so long struggled for, in making conditions easier and better, take the simplest view of what this means, and from that view gain a better knowledge and comprehension of the value of this information that is such a necessity to us, and the elevator of an occupation that is not only educational but interesting and fascinating.

Most interesting sciences, especially Chemistry and Electricity, require more than a superficial familiarity; perserverance, assiduity, and a prolonged education are essential if results are to be obtained. They ask a practical adroitness in the management of delicate complicated situations that continually present themselves.

How absurd, how preposterous it would be for one to profess to include all that is requisite for a complete mastery of these sciences, or even attempt to comprehend the many numerous facts involved, or to burden our memory with the retention of them all. Many of these facts may be of little interest to us at the present time, but in the future may be of great value to us. We have all probably discovered that the most difficult facts to comprehend are at times the most profitable, providing we can develop all that is good in them, or have courage and ability enough to master them. Therefore, if we should be judged more justly, we must sacrifice considerable of our prestige in respect for these most wonderful sciences.

But does this indicate that we should falter or languish? No! it should tend to encourage us to be more humble in our views, make us more firm in our progress that we may more readily solve some of the perplexities encountered, with perseverance enable us to evolve practical theories for improving conditions and give us a wider experience, giving us more self-reliance in putting our ideas to good, sound, practical tests.

What constitutes the difference between the good artisan and the bungler? Knowledge and skill. These may be attained by daily plodding, but that broader knowledge which leads to success, and that more perfect skill which wins distinction, can be acquired only through diligent study which gives greater knowledge and leads to greater ability, enabling the most humble workman to develop into the most skilled artisan.

The days of guesswork in Electro Plating have practically passed. In every detail of the Plater's calling knowledge counts for gain. Other things being equal, the Plater who strives to keep abreast of the times has an immense advantage over him who is content and satisfied to plod along in the footsteps of his ancestors.

The A. E. C., to my personal observation, is a mine of useful knowledge, containing information of thorough and trustworthy kind concerning every department of Electro Plating, from the simplest to the most complex. It proves to be a ready assistant and a capable adviser on all occasions. Looking back to the inception of this society, from the first rude efforts of a few men to the wonderful achievements at present time, where arrogance refuses to exist, is a topic full of interest to both the Electro Plater and to all concerned.

Liken to many of other sciences, especially the advancement of our companion science, Chemistry, which, during the past quarter of a century, has been greater than during any preceding period of similar length. While during these many years Electro Plating has been presented and explained to us by men who have advanced with this great industrial science equally as fast, who have devoted many years of study and labor in order that Electro Plating may be made more simple and practical, who have seen it grow from a molehill to a mountain with its many peculiar enchantments.

But to the future can we anticipate accomplishments equally as great as in the past? Or shall we be contented with what progress we have made and designate it "perfection?" Let us deliver ourselves from that silent order, "The Knights of the Silence"—as that old parable goes, the slothful servant who received his talent and buried it in the earth was called a wicked one by his master, and was punished by being deprived of even that which he had. Therefore, let us be generous.

Electro-Galvanizing

By Leonard Schmidt, Chicago Branch

Some of you are either doing electro galvanizing or may be called on at some time to put in a zinc solution, and you may be interested in learning how my work is handled. Then when called on you will be prepared, or at least you will know where to go for definite information, as this is what the A. E. S. stands for.

I am of the opinion that as soon as business picks up there will be rapid development in the galvanizing business, as some of the concerns that we are now doing work for will find it necessary to install their own plants rather than send their work out.

Where I am employed we run almost entirely on store fronts, nearly all of which is exposed to the weather and the plating must be heavy enough to stand it. My solution tauks are 18 feet long, 4½ feet wide and 5 feet deep, made from 4″ pine. The main wires from the dynamo and wiring on tanks are 1⅛″ in diameter. My tank rods are solid copper bars, also 1⅛″ in diameter. For each negative rod I use a 500 ampere rheostat.

You may be interested in knowing something about the volume of work that we turn out from this one tank in a year's time. In the first place there is our own work that must come through every day and a good deal of outside work that comes through pretty regularly, but I will only attempt to show some of our own work, as follows:

400,000 iron castings weighing 2 oz. each.

300,000 cold rolled draw plates, each 4 inches long punched to an oval shape.

70,000 feet cold rolled steel corner bars, each 16 feet long, weighing about 11 lbs. each.

3 tons cast iron sides, each 5 feet long, 2½ feet wide by ¾ inch thick, weighing 120 lbs.

My dipping tank is 6 feet long, 2 feet wide by 2½ feet deep, with a cross partition. This tank is also made of 4 inch stuff. One side of this tanuk is 14″ and is used for rinsing water; the other side is for nitric acid. The acid compartment is lead lined with lead that is ¼″ thick and free from zinc. In putting this lining in the tank I advise having the corners brazed together as solder will not stand the action of the acid, and while this will cost a little more, the lead lining will last enough longer to more than make up the difference in cost. The upper part of the tank has a glass partition and above this glass partition is a hood made of hardwood lumber tongued and grooved. This prevents the escape of fumes. Above this is a 16″ galvanized iron pipe covered both inside and out with asphaltum paint.

For my exhaust I use live steam instead of a fan. The steam pipe is connected 6″ below my fume pipe, which draws the acid fumes up the chimney.

My solution is made up as follows:

2½ lbs. Galvanizing Salts.
2½ ozs. Toning Salts.
2 ozs. Sal Ammoniac.
1 gal. Water.

I find it cheaper to buy toning salts rather than try to make it, as when you figure your time, waste and breakage you will find that in the long run there is nothing saved, and especially so as in most shops there are no facilities and frequently no place where zinc salts can be made to advantage.

I use only pure zinc anodes, elliptic shape, and I certainly advise any plater who is thinking of putting in a zinc solution to insist on getting the pure zinc anodes. The cleaning of anodes is, as you know, an important item. My own experience is that I get good results by cleaning them about every three months.

To get good results in galvanizing, the work, as you know, must be thoroughly clean. It seems unnecessary to impress on you the importance of this feature in connection with galvanizing. With perfect cleaning and suitable current in sufficient volume you should have no difficulty in turning out, day after day, work that is entirely satisfactory.

All of our cold rolled steel is dipped in nitric acid, then rinsed in water; and to get the uniform color back we dip the work in muriatic acid, then rinse off in clean cold water and from there to the plating tank.

We run our work about thirty minutes, which gives us a deposit equal to 1 oz. per square foot.

Our castings are treated in a horizontal tumbling barrel, in which I use 5 gallons of water to one quart of sulphuric acid. The castings are tumbled in this barrel for about ten minutes. They are then put through another tumbling process, consisting of water and soda, where they run for about thirty minutes, after which the work is taken out, dried and wired up ready to put into the electric cleaner and then in the plating solution. Better results can be obtained if the castings are sand-blasted.

I trust that the foregoing remarks may be of some benefit to the fraternity at large and I have brought with me a few samples for your inspection.

Black Nickel Solution

By Henry H. Posbeck*

As we search the printed records for special information, we are constantly reminded of the fact that knowledge is the result of concentrated effort, and the art of Electro Plating is no exception. I am sure that we have all received many valuable suggestions from a careful study of the many papers that have appeared from time to time in our Journal.

While personally I do not hope to cope in achievement with

*Foreman Plater, Peerless Light Co., Chicago.

our little giants or the shining lights of our profession, still it is through the success of some of our leaders that I have been tempted to pitch my hat in the ring and inflict on you tonight this paper which treats on a subject that I am sure will interest all of us.

Black Nickel is a subject that up to the present time has, as far as my knowledge goes, not received the attention that it merits.

Black Nickel as a finish has no limitations as a decorative agent in the metal finishing world.

We are still a long way from perfection in this beautiful effect which as you know can be used on all metals. Experiments scientifically conducted by such of our members as have the knowledge will do much toward this end. It is with this thought in mind that I bring forth this paper, and I sincerely hope that it may stimulate each member of our Society to add any knowledge he may have that will bring Black Nickel, as a commercial finish, to the greatest possible perfection.

Let me impress on your minds that I do not come before you as one who knows it all, but rather in the light of one seeking knowledge and willing to impart some facts and points which I have gained in the School of Hard Knocks, and if I can add something on this subject which will be of benefit to our members, thus adding to the common store of information, I will feel greatly repaid.

The formulas for Black Nickel and methods of running the solution vary greatly as we who have used it know. It is not my purpose to enter into any discussion as to the merits of any of these solutions, but rather to give you the benefit of my own experience and observations.

We may start with any good White Nickel Solution, but I always prefer building up a new Black Solution as I am then reasonably sure that it will contain nothing that later on may be a source of endless trouble.

Suppose then we start with a new White Nickel Solution. This should be brought to a neutral point by adding a good grade of Ammonia, and right here is where much of the trouble begins, as only enough Ammonia should be added to reach the neutral point —be careful not to get the solution too acid or too alkali—avoid either extreme.

I take from two to three ounces of Sulpho-Cyanide of Potassium to each gallon of solution. This I dissolve separately in warm water, and stir well into the solution. To this I add from one to one and one-half ounces of Sulphate of Zinc per gallon. This Zinc helps to bring out the good rich black that is so desirable.

I recommend using good soft nickel anodes and plenty of them. I also prefer anodes that have been used for some time, as the anodes then have a somewhat rough surface and seem to give up the metal more freely. These anodes should not be too light, as we then are apt to have a poor contact.

A very important point is the voltage—if the solution is properly made—the deposit and color depend entirely on the voltage

that is passing through your solution.

Your tanks should be equipped with suitable rheostat by which you can at all times obtain the range of voltage required, but if with present facilities you cannot get your voltage down low enough, you might make up a water rheostat and insert this between your regular rheostat and the cathode. To make up a water rheostat you require a barrel or large jar which will hold about 50 gallons of water. Fill to within a few inches of the top, then add about 8 to 10 pounds of common salt, or, better still, some Chloride of Ammonium, insert two plates, preferably brass, of a fair thickness, then connect one of these plates to the rheostat and the other to the cathode.

By manipulating these plates, that is, hanging them deeper in the solution or higher up, or by getting them closer together or farther apart, you will have absolute control of the current. You understand, of course, that this water rheostat is at the best only a makeshift and the tedious trouble of using it can be avoided by using a modern regulator that will give the range of voltage required.

I am at present using one of the Crown Rheostats that have recently come into the market in Chicago, with which I am able to reduce my current to one volt and five amperes or can regulate the current with absolute accuracy to the full capacity of the generator.

A Black Nickel Solution, to be satisfactory, must be maintained at neutral. If the solution is acid the deposit will be grey and streaky. I have found that this solution after having been used for some time is very apt to become acid, and when this occurs, I have found it best to neutralize with Carbonate of Nickel. But if the solution carries plenty of metal, I use a little Bi-Carbonate of Soda. If too much Bi-Carbonate of Soda is used the solution will become murky, a sediment will form in the bottom of the solution and the minute particles in suspension will adhere to the work being plated, with the result, as you know, of a rough deposit.

I am aware that some Platers use a little Cyanide or Copper Solution, but I prefer the Soda as it keeps the solution in good condition and has certainly given me unusually good results.

If the solution is too Alkaline the first trouble will be found in the Anodes which will cover over with a grey-black film. This will retard the deposit and unless corrected will lead to trouble, and right here is a chance to make the mistake of increasing the current to hasten the deposit. The result will be a grey and streaked deposit of no value. Again, if the article is left too long in an alkaline solution the deposit will be rough and of a brownish shade and not adherent.

In my experience I have found that large flat pieces of cold-rolled steel when placed in a tank of solution that shows indications of being alkine would have decidedly rough edges by the time the deposit had covered the center. This deposit could be readily rubbed off. In extreme cases the deposit will curl up or flake off during plating.

My experience shows that a deposit of from ten to fifteen min-

utes gives satisfactory results and that this will permit scratch brushing or coloring with a soft buff.

The work should hang about six inches from the Anodes. Do not allow your solution to get too cold if you want uniform and satisfactory results.

Some Platers prefer to "strike" their work in white nickel, but I have not found this at all necessary.

Work plated in Black Nickel should always be lacquered as it evens up and holds the color, especially when arsenic is used in the solution.

To strip a black nickel deposit is a disagreeable matter and ordinary dips have hardly any effect on this deposit. I have found that a warm Hydrochloric dip works well.

In conclusion let me add that I have worked a large black nickel solution for years, and have turned out day after day hundreds of pieces, large and small, of a good uniform color and without any special trouble, but I was not able to do this until after I fully understood the action of the chemicals used in their relation to the current, and I am quite sure that any of our members who will act on the suggestions as stated will get good results.

The Production of Rose and Green Gold Finishes By the Pigment Method Upon Art Glass Domes, Portables, Etc.

By Charles H. Proctor

The demand for art glass domes, gas and electric portables and electroliers is constantly on the increase and to suit the public fancy the manufacturer must be constantly on the alert to produce some new finish that will attract the buyer and if possible give him some advantage over his competitor. In this short article it is my intention to explain the method I followed in producing the rose gold and green finishes by the pigment method in response to the request of a well-known New York manufacturer.

To the majority of the members of our society who plate upon iron and brass in regular lines of manufacture, probably little is known of the method followed in the production of the articles enumerated. Briefly stated the method consists of casting the numerous parts in bronze molds. The metal used consists largely of antimonial lead, a by-product of the silver refining industry. This alloy produces sharp detailed casting and is very much used in the production of clocks and fancy toilet novelties finished in ormolu gold and French gray finishes. The disadvantages of the antimonial lead alloy is that it is very soft and brittle and requires considerable more labor to produce a finish upon the surface of the metal than when spelter is used. The alloy is also more difficult to cleanse and plate than the harder metal.

Recently a number of the more progressive manufacturers have adopted spelter in the production of their goods. The common spelter of commerce will not answer the purpose nor even prime

western spelter could be used for casting purposes in bronze molds owing to the cracks and shrinkage spots developed in the castings on cooling. So Bertha or New Jersey spelter is the only grade that has proved satisfactory for casting purposes along these lines. Many manufacturers find the material too expensive to use in their products, the metal costing at least two and a half times more than antimonial lead, but the difference in the specific gravity of the two metals make considerable difference in the weight of the casting. The antimonial lead castings are at least fifty per cent heavier than castings made from Bertha or New Jersey spelter.

I am going to give a trade secret away showing how one manufacturer, who found Bertha spelter too expensive to use, overcame the difficulty and is producing art domes and portables equally as good as others who use Bertha spelter entirely. The cost is only a very small percentage more than antimonial lead when the difference in weight of the two metals is considered and this variation is more than compensated by the ease in which the spelter castings are cleansed and plated. The method referred to is as follows: In the casting department a separate furnace is maintained and equal parts of Bertha spelter, costing 12 cents per pound, and western spelter, costing 6 cents per pound, are remelted together. After the proper melting temperature is reached the metal is recast in iron molds arranged for the purpose and then after cooling the metal is remelted and used in the regular production of goods. A peculiar coincidence is that unless the metal is recast in the iron molds and remelted the same difficulties develop as to cracking and shrinkage as when the commercial spelter is used in the castings. I know of a concern that saves thousands of dollars a year by adapting this remelting method because they were unable to use the ordinary grades for reasons stated and antimonial lead goods were out of the question owing to the high percentage of breakage in transportation.

Spelter can be polished by ordinary methods used in polishing sheet brass and cleansed in a like manner, but for finishes about to be described it is only necessary to scratch brush the surface before and after plating. Both operations are done wet. A little sal soda should be used as a softener in the brushing water. Before plating the castings should be immersed in a ten per cent solution of cyanide and water to remove any oxide formed. It is necessary to brass plate the articles for the respective finishes and while most any formula can be used that will produce a good yellow brass deposit I have found that for spelter the following formula gives excellent results:

Water	1 gallon
Copper cyanide	2 ounces
Zinc cyanide	2/3 ounce
Ammonium chloride	1/3 ounce
Sodium cyanide	2 2/3 ounces or
Cyanide mixture	3 ounces

This solution will stand about 3 degrees Baume, and can be run at 3 volts. To increase the rapidity of the deposit the density of

the solution can be increased if so desired based upon the given proportions.

For a brightener 10 drops per gallon of sodium arsenate may be used. This may be prepared in the usual manner by dissolving two parts of white arsenic in one part of caustic soda in as little water as possible. Usually 4 ounces of arsenic and 2 ounces of soda per pint of water is about the correct proportion. A very small amount of nickel carbonate or chloride dissolved in cyanide can also be used. The amount specified is the minimum amount, so, if necessary, the quantity can be increased proportionately. Anodes of brass may be used or copper, if preferred, which many platers find in their experience to give the best results in brass solutions.

The spelter work should be brass plated for not less than thirty minutes; then removed and washed thoroughly in cold and boiling water for a number of immersions to avoid any spotting-out. Afterwards the articles should be scratch brushed using a soft crimped brass wire brush for the purpose. The articles should then be thoroughly washed and dried and then spray lacquered, using any of the ordinary light gold lacquers on the market for the purpose. After thoroughly drying the articles should stand for several hours so that the lacquer may become sufficiently hard.

The rose gold may now be applied to the various parts, either in sections or the portables may be assembled entirely. The domes are always finished as a whole and the glass is usually put in position afterwards. To prepare the rose gold pigment dissolve six parts of dry and finely powdered orange chrome and one-half part of finely powdered red oxide or iron, such as is used in polishing gold jewelry. Mix these thoroughly and then dissolve in equal parts of turpentine and boiled linseed oil, using only a sufficient amount of the turpentine and oil to produce a thin paint mixture. To this mixture add to every pint one or two teaspoonfuls of hard oil finish varnish. Care must be used not to add too much of the varnish or the pigment when applied sets too quickly and is more difficult to remove. It also produces a painted effect instead of an opaque finish. Apply a little of the pigment with a half inch of five-eighths inch flat bristle brush. This should be quite thin so that the pigment can be spread rapidly as it requires very little for the purpose.

As soon as the background of the entire article is coated with the pigment it should stand for a few minutes and then the excess should be removed from the high lights with rags or cheese cloth. As soon as the excess is removed then an additional clean rag should be used slightly moistened with a mixture of equal parts of boiled linseed oil and turpentine to produce a clear finish. Afterwards the portable, dome or other article, should be heated for a short time in the lacquer heater and the result will be a beautiful imitation or rose gold which is difficult to detect from the genuine.

Green Gold

In preparing the green gold the same methods should be pursued as far as the gold lacquering and the drying of the articles is

concerned. It is very difficult to compound a green color suitable for a green gold, so in looking around for a suitable medium I decided to use a green that is known to French bronzers as composition green No. 3, used in producing the delicate green tones upon statuary bronzes made by Tiffany and Company and other well known makers at home and abroad. This pigment and other fine French colors and bronze powders, as well as the French varnish mixtures used in applying these colors on statuary work, can be purchased from Paul Uhlich and Company, New York, the importer. I merely mention this fact, not as an advertisement, but it may save considerable correspondence to the writer in answering questions as to where the French colors could be purchased.

The color for the green gold is mixed upon the same manner as mentioned for rose gold and the same methods of manipulation applied, as to wiping out and afterwards drying. This method will give one of the finest imitations of green gold and makes an attractive finish.

It can be readily seen that many combinations can be produced at will by varying the compositions of the colors. Blue green pigment applied to a gold lacquered surface in the manner stated produces an excellent royal bronze. The pigment should be made up from dry zinc white mixed with the turpentine and oil solvents, then faintly colored with ultamarine blue and then a very small proportion of light chrome green added so that when the color dries it will be a light bluish green which looks excellent upon a brush brass or gold lacquered article in the backgrounds.

The burnt ivory finish is so well known that I do not desire to comment upon it at this time, but a green ivory finish looks very pretty and attractive when applied to the metal surface. For this purpose No. 3 composition as previously mentioned should be applied in the place of the sienna combinations. Or a light chrome green mixed with a very little orange chrome dissolved in oil and turpentine with the hard oil finish as above stated. This color will give a very excellent combination with the ivory finish.

Scientifically Cleansing Iron

By E. S. Thompson, Member Chicago Branch*

I believe that in the above three words is embodied one of the most vexing problems with which we, as practical platers, have to contend. It is true that we are now using electric cleaners and nearly all of them have proven such an easy way to get rid of the oils and greases that the majority will say: "I am satisfied with what I have." But, Plater, *are* you satisfied? Are there not times when everything goes to pot because of the fact that your work is not properly cleaned? Does your cleaner at all times prepare your work so that it will receive a durable deposit and be strictly adherent? I do not believe that you are satisfied.

*1400 Lake View Road, Cleveland, Ohio.

I may not be able to bring anything new before you; but I can at least give a few suggestions which may help some worthy man along this line. (They who belong to the A. E. S. are all worthy). I have given the subject much thought and have tried a great many different cleaners as electrolytes and while some of them were excellent under certain conditions, they all lack something which makes them universally satisfactory.

I began working on a method of cleaning about two years ago, which I am proud to state has proven very satisfactory to me, when I am able to install the equipment necessary to the theoretical working of it. We all know that when we hang the work to be cleaned on the cathode side of the electric circuit in a solution of potash or soda that the work will receive a deposit of potassium or sodium, as the case may be, which has the appearance of a dull gray, spongy substance, soft to the touch and rapidly turning black upon exposure to the air. It follows, then, that caustic soda or caustic potash is unfit for a cleansing agent when used in connection with the electric current when the work is cleaned as a cathode. Neither is it suitable as an electric cleaner when the current is reversed, owing to its tendency to corrode the iron.

Failing to find a suitable cleaner already on the market, I began to experiment. I gave a synopsis of my method in the October, 1913, issue of the Metal Industry; but I did not go into the details of it. I shall now explain just how it is worked and you can judge for yourselves, after trying it, as to whether it suits your needs.

Dissolve about 1 pound of caustic potash in each gallon of water and add from 2 to 4 ounces of cyanide of potassium. The amount of each can be increased if you have less than eight volts and it will work more rapidly with any voltage, if double the amounts of potash and cyanide are used. Place a double throw switch at the tank so that you can reverse the current when desired. It will seldom be necessary to do this, if the solution is used boiling hot and with a strong current, as the abundance of hydrogen liberated seems to throw off the metallic deposit as fast as formed. It may be, too, that a reaction takes place at the instant of the breaking up of the molecule which redissolves the deposit of potassium or sodium or both. We can only surmise what takes place under the electrolysis of this solution; but the theory is that the solution of carbonate (which caustic potash becomes when dissolved in water) changes to caustic properties, or, rather, caustic potash or soda is set free in a nascent state at the cathode by the decomposition of water, the water giving up a large volume of its hydrogen, around the cathode, the oxygen uniting with the potassium or sodium to again form hydroxide, which is rapidly taken up by the adjacent hot water. I am not able to explain all of the reactions of an electric cleaner and I do not believe that anyone else can do so, owing to their complicated nature. We cannot analyze gases liberated by an electric current which are instantly taken up by the solution from which they were derived, we having only to surmise or guess at what takes place,

and the fact may or may not bear us out in our theory. But there is both a mechanical and chemical action in the above solution, the hydrogen liberated serving as the mechanical part, in that it forms around or under the foreign substances, carrying some of the greases or oils with it to the top of the solution. The chemical action is mainly a saponification of the grease and oils. I believe that all of these take place. I want to impress upon those who, if any, try this method the importance of a strong current when applied direct as for plating and the solution boiling hot. The best results are obtained when the solution is kept boiling until the load is in and then the steam valve closed. This gives the current uninterrupted action and the solution will leap two or three inches around the work. This phenomena is caused by the rapid liberation of gases and two or three minutes will serve to clean anything that comes direct from the polishing room and five minutes has cleansed work which had been machined and handled by greasy-handed laborers and lain in stock for months. This without any previous brushing or cleaning.

There will be times when foreign substances will be deposited on the work, such as potassium, sodium, copper, zinc, tin, lead, even iron or nickel, which may be introduced into the solution by carelessness or accident or by the failure of the heating system to give sufficient heat or by the generator falling down unexpectedly. For such occasions be prepared by having a rheostat in the circuit so that the current can be cut down to two or three volts or lower, according to the load, and reverse the current, making the work the anode. As nearly all of the metals except copper will be deposited in an impure state, they will be readily dissolved and removed by the action of the current and solution, the oxygen liberated at the positive or cathode side, which is now the objects to be cleaned, being taken up by these impurities, making them highly soluble in the solution, the purer metals being deposited on the side of the tank and the insoluble substance being separated thereby, falling to the bottom as a precipitate. Just what part the cyanide plays in this solution outside of giving it greater conductivity is hard to say, unless it be that its cyanogen takes up and retains in solution the most of the impurities which enter it in the form of metallic oxides and the affinity of cyanide for such oxides being greater than the affinity created by the electric current prevents their deposition to a certain extent upon the objects. I base this upon the fact that almost any cyanide solution when containing a large excess of cyanide refuses to deposit its metal even under a high current density. Then too, the cyanide greatly assists in dissolving the impurities when deposited on the work and the reverse current is used to clean it of them. Anyway I found that the cyanide is indispensable to good work and I continue its use.

In using the current direct as for plating when the work is first suspended in the solution, we are enabled to use a very high current density and remove by reason of action heretofore explained, all

greases and oils, which is the paramount issue. After this has been accomplished, we can cut down the density of the current and reverse, thus throwing off the impure metals which have been deposited, as previously explained. Or, if there is plenty of time, the work can remain suspended in the solution with the switch thrown out and the solution itself will redissolve the impurities, the lye taking care of its own product and the excess of cyanide taking up any copper which may be present.

The above method, when handled intelligently, will eliminate nearly all the troubles experienced in cleaning steel, parts of which have been assembled and the joints of which contain greases being freed from such grease or oils in a short time, though requiring somewhat longer than those parts which have no joints or seams.

For cleaning copper and its alloys there is no better cleaner known to the writer than pure aluminum hydrate, a product of the electric smelter. But the pure hydrate must be obtained, at least free from copper. We all know that aluminum cannot be deposited in a free state from its solutions and that makes it an excellent conductor for the electric current, which in this case is simply a mechanical cleaner, having very little, if any chemical action upon the work, its caustic taking up the aluminum in preference to a stranger.

Now in conclusion, I want to state that I do not know that I have told you anything which you do not already know, but I hope you will receive it in the spirit in which I give.

I would like to have some of the members of the A. E. S. write me, asking any question they desire information on. I may not be able to answer all of them satisfactorily. What I mean by this is the general run of plating in bronze, brass, copper, galvanizing, nickel, tinning, either electric or hot process, finishing, methods of polishing, etc. I know very little about gold and silver work.

QUESTIONS AND ANSWERS

Mr. H. H. Williams of the St. Louis Branch sent out a number of questions to the members. Below are the answers received:

Mr. H. H. Williams, Secretary, St. Louis Branch, A. E. S.,

Saint Louis, Mo.

Dear Sir:

Permit me to congratulate your Branch for the progressive step it has taken in asking members of other branches for information. This is a splendid idea, and to show my appreciation of your efforts, I will endeavor to answer the questions to the best of my ability, on condition that all replies received be published in our Monthly Review, so nickel-platers, who are members of other branches, may benefit thereby. Realizing that I do not know it all, should it not be published, I respectfully request copies of the answers received by you, so that I may know the views held by others.

Ques. 1. What causes copper plating to streak, making it hard to buff out, and being very rough?

Ans. I take it for granted you mean cyanide baths. Not enough copper for the amount of cyanide in solution, and too little current, causing the hydrogen to be deposited with an insufficient amount of copper.

Ques. 2. What is the best acid dip to use on stove work when an electric cleaner is used?

Ans. Hydrochloric acid. Such a dip is meant to be used only momentarily for removal of the oxide of iron (Fe. O.) caused by exposure to the air in carrying the objects through the different processes previous to hanging in solution. Sulphuric acid will not remove it as fast as (Hcl.) Hydrochloric acid. It matters not whether an electric cleaner is used or the hot Potash-lye is used.

Ques. 3. Is it well to insulate lead pipe in a nickel tank?

Ans. It is not necessary to insulate it for use in a nickel solution, for the reason that Nitric acid is the only acid that will dissolve lead; and but slowly in boiling Hydrochloric. Sulphuric acid, of the most concentrated description is without action on lead.

Ques. 4. What causes pitting?

Ans. I suppose you mean in nickel plating. To answer this question it is necessary to describe the chemical changes, actions and re-actions in a nickel solution taking place when plating when the double nickel salts is used.

($Ni\ SO_4 + NH_4\ SO_4$) Nickel Sulphate with Ammonium Sulphate.

Theoretically the bath should be neutral. In practice it is better to maintain it acid because secondary reactions, which constantly take place during electrolysis tend to liberate ammonia, and these render it alkaline and alkaline baths give trouble by depositing a basic compound of nickel. Moreover they tend, other things being equal, to give a darker deposit of nickel. On the other hand excessive acidity must be avoided as it may entirely prevent the deposition of nickel upon the object to be plated, and if deposited will peel off. The cause of the increasing alkalinity is, no doubt, to be ascribed to the simultaneous decomposition of the nickel sulphate with a small proportion of the Ammonium Sulphate.

The Ammonium Sulphate under electrolysis deposits Sulphuric acid upon the anode which, by combining with it, adds an equivalent weight of nickel to the bath, while it throws down the elements of the ions Ammonium (NH_4) upon the cathode. Thus the Sulphuric acid is neutralized by the nickel and the bath is enriched to that extent by the fresh nickel introduced, while the Ammonium is broken up into Ammonia (NH_3) and Hydrogen (H); the ammonia dissolving in the solution and tending to alkalize it, and the Hydrogen escaping as a gas from the surface of the object being plated.

Chemically this is what takes place:

At cathode $Ni + NH_3 + H$ (Nickel with Ammonium and Hydrogen); at anode $Ni\ SO_4$ (Nickel Sulphate), in depositing nickel, Hydrogen is usually deposited to some extent with the metal, causing pitting, and this must be minimized as far as possible by

regulating the strength of the current and the solution, remembering that a strong current and a weak soluion alike favor the evolution of hydrogen. This principle is true in all cases.

Whenever much Hydrogen is given off the deposited metal becomes pulverent and the absorbtion of Hydrogen undoubtedly tends to brittleness; or when the solution is so weak in metal requiring a long time before it is covered with metal, but the decomposition of the solution by the current (with little metal in it) the cathode is covered wih an excess of Hydrogen bubbles, practically insulating it (air bubbles) and that is the cause of pitting, and accounts for the "nigger in the wood pile," as we say down here.

Ques. 5. Is it advisable and necessary to filter nickel solution occasionally?

Ans. Yes. I do mine twice a year. I believe all plating solution should occasionally be filtered. Filtering only means purifying or cleaning it, and cleanliness in nickel plating is more important than in any other branch of electro plating, for the reason that a nickel solution contains no solvent actions on impurities like Cyanide baths.

If inconvenient to filter, the next best thing to do is to syphon off the clear solutions into another tank or recepacle until all the clear solution has been taken out and the slime and dirt left thrown out.

Ques. 6. How does the temperature of a nickel solution effect the plating of stove work?

Ans. The temperature has a great deal to do not only with a nickel solution but all solutions and on any class of metal, be it castings or what not.

Chemistry deals with changes taking place in different ways. Heat or atmosphere causes chemical changes. Higher temperature aids chemical changes. Acids, however so lightly heated will act quicker. This we all know, and in a nickel solution containing acid the Sulphuric acid is slow to act on the anodes when below the ordinary temperature.

Questions Nos. 7 and 8 are answered in No. 4.

I won't answer questions Nos. 9 and 10, taking it for granted that those who have made a specialty of it are better fitted to handle the subject. Nickel is my specialty. I made it my profession.

JOSEPH WALTERS,
Richmond, Va.
Member New York Branch, and Foreman, Southern Stove Works.

Ques. 1. What causes copper plating to streak, making it hard to buff out, and being very rough?

Ans. It is a long time since I ran a copper solution, but from my experience the streaking out was caused by dirt and grease working out of bolt holes and crevices in parts that you cannot get at. The cyanide will drive it out and streak it and make it hard to buff. Too much voltage or a dirty solution which ought to be filtered out.

Ques. 2. What is the best acid dip to use on stove work when the electric cleaner is used?

Ans. I do not use an electric cleaner so I cannot suggest, but I have used dip for the last 25 years. One part muriatic acid and 10 parts water on stove work.

Ques. 3. Is it well to insulate lead pipe in a nickel tank and why?

Ans. If you do not insulate the pipe you will have a short circuit on the pipe which you can detect on the tank for a half a mile if the voltage is strong enough and besides it will plate a very heavy deposit on the pipe; that is from the current in the solution.

Ques. 4. What causes pitting?

Ans. There are several reasons; I can enumerate a good many. The oxygen gas that forms on the work rod. Now it is very little work for the plater running the tanks to strike the rod and relieve the gases. This is why they recommend an agitator in the tank. My biggest trouble with pitting on stove work is the polisher does not rough out the work thoroughly and get below the surface of the iron. Spongy castings around the gate. And another reason for pitting is to have spongy anodes that will crumble and flow through the solution and settle on the work. Every grain that sticks to the work will leave a pit spot. Every bit of pumice stone that is not rinsed out will leave a pit and where castings are nickeled will leave pits. When the casting is porous and not well roughed out after nickel is in stock will pit out. A high voltage will burn the work and make it hard to buff and rough and will show pit marks. They say high gravity in a nickel solution with the hydrometer (say above the gravity of 7 degrees) is very rich solution in free nickel in the solution will cause pits.

Ques. 5. Is it advisable and necessary to filter nickel solutions occasionally?

Ans. I think it absolutely necessary at least twice a year if for no other reason than to get a nice smooth deposit which buffs easily. If not filtered the deposit comes out very rough and is hard to buff and the yellow precipitate makes a very dirty solution when disturbed.

Ques. 6. How does the temperature of a nickel solution effect the plating (of say) of stove work?

Ans. I find the temperature of a nickel solution helps a good deal, in fact, you can double your output. Say warm about 80 degrees, the higher the degree the faster the deposit. Do not get as white a deposit as with low temperature and where solution has a tendency to peel the black oxide off of the anode and flows through the solution which settles on the work and that makes it hard to buff and will cause it to pit.

Ques. 7. What causes nickel to plate dark?

Ans. Some add ammonia, some boracic acid, and some add chloride of cadmium to bring up a white back ground.

Ques. 8. What is the cause of nickel being brittle?

Ans. A high voltage makes it plate very rapidly and will cause it to be brittle. Some say ammonia, some boracic acid makes it

brittle, but I have experienced chloride makes it brittle which is very little used in nickel solutions.

Ques. 9. What is the best way to make a blue steel solution?

Ans. It is not in my line as I have never run one so I have like the Dutchman to say "ich weist nicht."

Ques. 10. Which is the most successful Electric Cleaner?

Ans. I would not attempt to discuss Electric Cleaners because I have never run one but would like to and tried hard to get one but I am shy on the voltage with my dynamos.

JOHN T. M'CARTHY,
St. Louis, Mo.
Foreman Plater, Bridge and Beach Mfg. Co.

The list of questions submitted leads me to believe that the members desire to make the most of the A. E. S. I would very much like to hear the replies.

I am not familiar with all of the subjects mentioned, have never had occasion to make a blue steel solution and do not plate stove work. Have never used an electric cleaner to any great extent except the copper clean and flash. In electric cleaning the theory is that the gas evolved at the electrodes rids the work of the dirt. As two-thirds of the gas is given off at the negative electrode the work is usually used as the cathode. In course of time the cleaner gives trouble by depositing a film of the metallic contents of the solution, sodium or potassium or perhaps something dissolved from the anode (the iron kettle or steam coil). So then a reverse current is used to remove this objectionable film.

Sometimes the work is used as the anode and the cleaning process requires twice the time and the chemical condition of the bath becomes such that the current begins to dissolve the anode and destroys the lustre of the work. An alternating current of 110 volts has been recommended to overcome these difficulties but it seems to me a plating dynamo could be converted into a low voltage alternator. And then I would suggest that the tank and steam coils be left out of the circuit and that both conductors be connected to work rods and work to be cleaned should be hung on each, thus all the gas liberated would be utilized. This plan could be used with a direct current but work would need to hang twice as long on the positive rod.

I don't know if this idea is really practical or not—I would like to know if it has been tried.

If question No. 1 refers to a cyanide copper bath a rough deposit could be caused by too large current, too large metal content, and too little free cyanide.

When a cyanide copper solution is deficient in free cyanide it deposits copper faster than the anode is dissolved and thus robs the solution liberating cyanogen and tends to correct itself but is hindered by the unstable nature of cyanide.

The same reactions take place in a nickel bath. If the bath is alkaline, metal is deposited faster than it is dissolved, producing a

dark, brittle and rough deposit. The solution is robbed of metal but the (SO_4) radical is liberated forming acid with the hydrogen of the water, which corrects the bath in time. I believe it advisable and necessary to filter nickel solutions occasionally. I have just finished filtering 1000 gallons and I am getting a brighter deposit. I also clean the anodes and notice by the ammeter that the current flows freer. If I can get better results I don't mind a little waste. I don't believe in straining at a gnat and swallowing a camel. When you start to discuss pitting you will have something started. We agree that it is caused by gas bubbles, but what conditions of the bath aggravate this? When I started to filter my solution it was pitting some. An essay showed that the metal content was 1.67 oz. metallic nickel per gallon. I added water to bring it down to 1.62 which is the amount I desired. I am getting better results now but don't know if it is due to a cleaner bath or less metal content or a raise in temperature because it is warmer now and I had no good way to heat my solution. We will get more light on this mystery when we make a careful analysis of different solutions, taking note of the workings of each.

I sent you, by post, a sample of nickel plating I did, using as high as 9¼ volts and about 30 amperes per square foot, getting an average weight deposit in 5 minutes. By the same process I plated work longer, getting a deposit 6 times as heavy which was as bright as that I sent you.

Yours truly,
E. W. HEIL,
Wichita, Kansas.

Foreman Plater, Coleman Lamp Co. Member of St. Louis Branch.

Ques. 1. What causes copper plating to streak and be very rough?

Ans. I have always found the solution too concentrated, so I would then reduce it to 10 degrees Beame and use a little cyanide.

Ques. 4. What causes pitting?

Ans. The only time I have had pitting is when the voltage has been too high, or when there was not enough metal in the solution. I always watch to have right amount of metal in solution.

Ques. 5. Is it advisable and necessary to filter nickel solutions?

Ans. I think it is when solution has been used a long time.

Ques. 7. What causes nickel solutions to plate dark?

Ans. I found this trouble when there was not enough metal in solution, also when it was too concentrated, in which case I would bring to about 5 degrees Beame.

CHAS. FISCHER,
Member St. Louis Branch.

Ques. 1. What causes copper to streak, making it hard to buff out and being very rough?

Ans. Too much current, or you put sal-soda in the solution.

Ques. 4. What causes pitting?

Ans. Not having good clean solutions and anodes.

Ques. 5. Is it advisable and necessary to filter nickel solutions occasionally?

Ans. Yes.

Ques. 7. What causes nickel to plate dark?

Ans. Too much acid.

GUS MINKS,
Member St. Louis Branch.

Ques. 1. What causes copper plating to streak, making it hard to buff out, and being very rough?

Ans. Streaked and rough copper plating in cyanide and acid copper solutions may be caused by too strong a current with a low metallic content, or by impure copper salts, or by the absence of a small amount of free cyanide, or free sulphuric acid according to the kind of bath.

A copper solution giving above trouble often will right itself by the addition of about one oz. of common alum dissolved for each gallon of solution, thorughly agitated, and allowed to settle over night.

In heavy duplex copper plating of large work, it is a good plan to keep the acid bath agitated by forcing air through a pipe full of small pin holes near the bottom of the tank. The air bubbles naturally rise to the surface very rapidly and keep the bath constantly moving, also at the same time freeing same from the numerous hydrogen bubbles caused by the strong current necessarily used. This will also cause the heavy deposit to be much smoother, more even, and brighter than otherwise.

Ques. 2. Is it well to insulate lead pipe in a nickel tank and why?

Ans. It is wise, though not necessary, to insulate lead pipes. Precaution is much better than trouble. A piece of work dropping to the bottom of the tank touching the lead pipe and falling against an anode will of course cause the lead pipe to act as an anode and will contaminate the solution if left there long enough.

It will also cause holes to be eaten through the pipe, thus allowing the steam condensation to be forced into the solution.

Ques. 3. What causes pitting?

Ans. Pitting is caused by an excess of hydrogen generated at the cathode and clinging to the work in the form of minute bubbles. Pitting is mostly found in solutions that are low in metal content, poor in conductivity, or those that are too acid.

The metal content of the bath should be raised by the addition of single nickel sulphate salts.

The conductivity can be readily increased by adding sodium chloride, (common salt) or sal ammoniac of about 1½ to 2 oz. per gallon of solution.

The excess of sulphuric acid can be neutralized by the addition of carbonate of nickel, which will unite together, forming nickel sulphate, water and carbon-dioxide, the latter passing out of the solution in the form of a gas.

Ques. 4. Is it advisable and necessary to filter nickel solution occasionally?

Ans. The amount of dust and dirt in different plating plants vary according to the location of the plating room, and the class or condition of work to be plated.

Most plating solutions ought to be siphoned off carefully, tank thoroughly cleaned and lining examined, and smoothed and the solution if dirty, or if it has been plating rough, filtered back into the tank at least once a year, the plater should use his judgment as to how often it is necessary to do this. It is necessary for a plater plating nickel on fine work made of brass or copper to clean his tanks more often than would a plater doing ordinary stove work plating. Also if a bath contains dirt and iron settlings in the bottom and a large copper urn or tank should be immersed in the solution to be plated, the inflow of the solution would cause the dirt and grit to rise and the result would be a rough deposit.

Ques. 5. How does the temperature of a nickel solution effect the plating (of say) of stove work?

Ans. A warm nickel solution will plate brighter and quicker than a cold solution. The deposit of a warm bath is softer and more homogeneous and the density may be kept higher than in a cold one.

Ques. 6. What causes nickel to plate dark?

Ans. Nickel solutions that plate dark upon testing will be found to be alkaline, poor in conductivity and generally need additional nickel salts.

The trouble should be remedied by neutralizing the alkaline condition of the bath making same slightly acid by the addition of boric-acid. The conductivity should be increased by adding about 2 oz. of sodium chloride (common salt) or sal ammoniac for each gallon of solution.

If the supporting anode hooks are of copper, and are allowed to extend down into the solution, it will contaminate the solution and cause it to plate dark. Raising the copper hooks out of the solution and plating with a heavy current for a short time, will cause the foreign copper to plate out of the bath and same will right itself again.

Ques. 7. What is the cause of nickel being brittle?

Ans. Plating deposited on work in a nickel bath that is too acid will be brittle, hard, and very apt to peel, especially if buffed too hard or if marred by a wrench, saw or other tool or hard object.

Nickel solutions may become too acid by castings releasing acid from the pores that they absorbed while being pickeled. Renickeled copper or brass work that has been stripped of old nickel by an acid strip and not thoroughly rinsed or cleaned on inside by potash or other cleaner will cause a solution to become acid if done on a large scale.

E. J. MUSICK,
Musick's Plating Works,
St. Louis, Mo.

WHAT THE BRANCHES ARE DOING

NOTE TO THE SECRETARIES—All correspondence for this department must be in the hands of the editor by the 15th of each month.

SUPREME SOCIETY

Meets first week in June, 1915, at Dayton, Ohio. Secretary, Walter Fraine, 507 Grand Avenue, Dayton, Ohio.

NEW YORK

Meets fourth Friday of each month at Broadway Central Hotel, New York City, 8 P. M. Secretary, Joseph Minges, 148 Schenck Avenue, Brooklyn, N. Y.

The regular monthly meeting was held July 24th at the Broadway Central Hotel with President Haddow in the chair and a fair attendance. The resignation of Mr. J. A. Still was received and accepted. Mr. P. J. Starzman was given a transfer to Philadelphia branch. The following members transferred to Bridgeport branch: P. J. Onkey, H. M. Dawson, S. Marsek, J. M. Dunn, W. S. Elwin.

An interesting discussion was held on the aims and objects of the Society and the best way to diffuse knowledge to its members. This branch has not yet secured a permanent meeting place and until such quarters have been secured the meetings will be held at the Broadway Central Hotel.

An outing will be held for members and wives and friends at Glenwood, L. I., Sunday, Aug. 16th.

CHICAGO

Meets fourth Saturday of each month, 8 P. M., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting was held July 25th with Mr. Oscar Servis presiding. Mr. Munning of the Munning-Loeb Co. was present and interested the members with a short talk, expressing the hope that the electro-engravers might be taken into the membership of the Society, as their problems were similar to those of the electro-plater.

Mr. Fred J. Liscomb held the attention of the large gathering of members for more than an hour with a practical demonstration of the analysis of a nickel solution, every member present being greatly interested.

Mr. H. H. Posbeck read an exhaustive paper on Black Nickel, presenting in detail the various angles of this useful solution.

A committee, to be known as the Dayton Convention Club Committee, was appointed to formulate plans and collect funds for the purpose of encouraging the members of Chicago Branch to attend the 3rd annual convention of the A. E. S. to be held at Dayton, Ohio, next June. The committee appointed follows: Chas. B. Wrout, H. H. Posbeck, J. P. Manz.

The application fee for membership in this branch has been raised to $2.00 commencing Aug. 1st.

The secretary was instructed to notify all delinquent members if dues were not paid by September 1st they would stand suspended from the Society.

Mr. Joseph Emmett was appointed Sergeant-at-Arms.

DETROIT

Meets first Friday of each month at Prismatic Hall, 140 1st St. Secretary, George J. Kutzen, 518 Alfred St., Detroit, Mich.

The regular monthly meeting was held Aug. 8th with our newly elected president, John Schultz, in the chair. As he lifted the gavel to call the meeting to order he was greeted with hearty applause and presented with a beautiful bouquet of flowers.

Detroit Branch has moved into more congenial quarters at the Prismatic Hall, 140 First Street, where we will be at home the first Friday evening of each month to all visiting members of the A. E. S.

Librarian Shepherd called on President Schultz to relate his experience with the so-called "High Speed" nickel salts. He found their use resulted in peeled work, yellowish looking deposits and the claim for bright deposits was not fully sustained on work requiring one-half hour to one hour deposit. He is resuming the use of single and double nickel salts with excellent results and no worry.

Mr. Albert J. Ratz has promised us a paper on electric cleaning compounds in the near future.

MILWAUKEE

Meets first Friday of each month at Eagles Hall, 137 Second St. Secretary, E. C. Yaeger, 962 Ninth St., Milwaukee, Wis.

The regular monthly meeting was held Friday, Aug. 7th. Various subjects were discussed.

At our next meeting we will have for discussion the following questions:

What is the best way to make a nickel solution?

Does the use of single nickel salts result in a hard deposit?

What can be added to a nickel solution to increase its conductivity?

How can we tell when a nickel solution is low in metal?

How can a nickel solution be made to plate bright?

How can a nickel solution be made to plate faster?

How can we tell when a nickel solution is low in conducting salts?

What makes a nickel solution plate black?

What causes a nickel solution to plate rough at the bottom?

What causes foaming of a nickel solution?

What makes a nickel solution cloudy after being worked hard all day?

If a nickel solution plates a hard metal, how can it be changed so that it gives a soft deposit that will stand bending?

We would like to receive answers to these questions from members of the various branches.

ROCHESTER

Meets second Friday of each month at Hotel Rochester. Secretary, C. V. Haring, 306 Dewey Avenue, Rochester, N. Y.

The July meeting brought forth the usual amount of interesting subjects and much interest was shown in the discussions. The mechanical plating apparatus and its solutions being the leading topic.

A discussion of the merits of the various electric cleaners will be had at the August meeting.

We shall miss the congenial presence of Mr. J. Gorden at our meetings as he has accepted the position of foreman plater with the Blue Ridge Mfg. Co., Susquehanna, Pa., but it is very gratifying to know that manufacturers are recognizing the superiority of men who are spending their spare moments obtaining knowledge through the A. E. S. While it is easy for the Knights of the Keg to get a crowd, an educational society has to work for its existence, but the results are far different.

TORONTO

Meets fourth Thursday of each month at Occidental Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, P. O. Box 5, Coleman, Ont.

The regular monthly meeting was held Thursday, July 23rd, with President Magill in the chair and a fair attendance. A real good meeting, was the opinion of all present.

After the regular routine business, discussions on cleaners, tin solutions, pickles and a number of other platers' trials and troubles kept things humming till a late hour.

NEWARK

Meets first and third Friday of each month, 8 P. M., 833 Broad Street, Newark, N. J. Secretary, Chas. A. Stiehle, 46 West Madison Avenue, Irvington, N. J.

The regular meeting was held August 7th with Horace H. Smith presiding. There was a fair attendance considering the extreme hot weather.

C. O. Field, recording secretary, tendered his resignation owing to change of position.

It was resolved to accept the resignation with sincere regrets.

It was decided to fill vacancy at once and Edward W. T. Faint was unanimously elected to fill the unexpired term.

Messrs. N. E. Dabolt, R. H. Sliter, C. Flannigan, and T. B. Haddow, all of New York Branch, were present. Remarks were made by each and they entered into the discussion of the use of carbon bisulphide in silver plating solutions. The general idea was that it made the deposit harder, and that the deposit retained its

lustre longer, did not tarnish as quickly as the work plated in the ordinary solutions.

A paper was read from H. O. Donnell on "How to prepare and manage a brass solution."

The Committee on Furnishing the Laboratory are still busy and reported progress.

When the cool weather sets in this Branch expects to increase their activities.

ST. LOUIS

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, H. H. Williams, 2134 Nebraska Avenue, St. Louis, Mo.

CINCINNATI

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Normand, 720 Froom Ave., Cincinnati, Ohio.

BRIDGEPORT

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secretary, Nelson Barnard, 858 Howard, Ave., Bridgeport, Conn.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Penna., 34th and Spruce Streets, Philadelphia, Pa. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia, Pa.

DAYTON

Meets first and third Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Alphonz Lamoureux, 500 East First Street, Dayton, Ohio.

BUFFALO

Meets first Saturday of each month at the University of Buffalo, 8 P. M. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N. Y.

INDIANAPOLIS

Secretary, pro tem, J. C. Davenport, 349 Massachusetts Avenue, Indianapolis, Ind.

APPLICATIONS FOR MEMBERSHIP

CHICAGO—

M. E. Wainwright.....Coleman Hardware Co., Morris, Ill.
Jacob Hay.....2034 Bissell St., Chicago, Ill.
O. A. Norberg.....3621 N. Sawyer Ave., Chicago, Ill.

DETROIT—

Elmer C. Washer.....384 Lawrence Ave., Detroit, Mich.
A. T. Wagner.....954 Vermont Ave., Detroit, Mich.

NEWARK—

William Taylor.....Newark, N. J.

BRIDGEPORT—

William Kusterer.....559 Grand St., Bridgeport, Conn.
Chas. H. Poland.....546 Sea View Ave., Bridgeport, Conn.

ELECTED TO MEMBERSHIP

NEW YORK—

Edward T. Laurence. Tuttle & Bailey Mfg. Co., Brooklyn, N. Y.

CHICAGO—

M. J. Walsh.....1920 W. Kinzie St., Chicago, Ill.
Edward Howard.....809 Prospect St., Elgin, Ill.
Fred A. Heid.....1932 Warren Ave., Chicago, Ill.
Henry Magnus.....442 N. La Salle St., Chicago, Ill.
William S. Moore.....840 W. 49th Place, Chicago, Ill.

DAYTON—

Lester J. Cope..Collinwood & Delaware Sts., Toledo, Ohio
Leslie D. Pierce.....418 Baltimore St., Middletown, Ohio

CHANGE OF ADDRESS

E. J. Mercil.....1909 Fulton St., Chicago, Ill.
W. C. Emard.....1909 Fulton St., Chicago, Ill.
W. J. Lotts.....1633 Kedvale Ave., Chicago, Ill.
A. Frank.....2719 Richmond St., Chicago, Ill.
Wm. Voss.....1856 Richmond St., Chicago, Ill.
Ernest Coles.....P. O. Box 5, Coleman, Ont., Canada
J. Gordon.....Blue Ridge Mfg. Co., Susquehanna, Pa.

NOTICE TO BRANCH SECRETARIES

The Supreme Auditing Committee requests that the Branch Secretaries send in their yearly report at once. Blank forms were sent out for this purpose some time ago. It is very necessary that the committee have these reports at the earliest possible moment.